

PRESS, PUNCH & DIE

5 BACKGROUND OF THE INVENTION

This invention resides in a press to be used to form and bend the projections on the outer edge of a circular disc with an over hanging shape. The center line of the stroking member holding the punch is at an acute angle to the indexing table holding the rotating disc as it
10 passes the stationary die section. Prior to this bending operation, the projections on the outer edge of the circular disc are bent up at a little more than the acute angle to clear the raised portion of the die. By bending only one projecting member of the disc at a time, this member can be very strong. One of the products that can be produced by
15 this press, punch and die combination is a sheet metal wheel which will accommodate a band shaped tire that has limited flexibility.

DESCRIPTION OF THE PRIOR ART

Metal bars and sheets have bent while held with two tools. A machine called a press brake does this. Soften red hot metal has been
20 bent to form horse shoes over the horn of an anvil with a hammer. Presses with punches and dies have been used to form special bent shapes. Some parts are made complete by progressive dies made by Oberg. Bliss, Minister and others make large presses for many different uses. One company that makes an indexing type of press is V & O. This is
25 used for notching lamination for electric motors.

SUMMARY OF THE INVENTION

The present invention resides in a press, punch and die combination to be used to form and bend projections on the outer edge of a circular sheet metal disc with an over hanging edge. One
30 projection is bent at a time. Then the disc is indexed to the next projection. The over hanging shape is accomplished by having the center line of the punch at an acute angle to the die top surface.

The indexing may require a ratchet type gear with a controlled reciprocating plunger or a stepping motor with a gear reduction. A strong member can be bent when only one member is bent at a time. A wheel with spring action and with a groove for a flat sheet like
5 tire is easily formed.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a plan view of a sheet metal wheel blank.

Fig. 2 is a cross-sectional drawing of a metal wheel blank with outer members pre-bent for final forming.

10 Fig. 3 is a partial cross-sectional drawing of a press, punch and die to form and bend projecting members on the outer edge of a circular sheet metal disc forming over hanging edges.

DETAIL DESCRIPTION OF THE INVENTION

This invention resides in a press, punch and die combination to
15 bend and form over hanging edges on members of a sheet metal disc by indexing and bending one member at a time. There is enough force available. The upper face of the die with the pocket for the forming punch makes an acute angle with the axis of the punch permitting an
20 overhang on the formed part. The metal wheel blank can be made many ways. A purchased blank in any quantity made from 1095 spring steel, flame cut and annealed can be obtained from steel companies. After the part is formed, it can be sent to a heat treater to harden by heating at
25 for elastic limit of 150,000 to 310,000 psi. A dimpling operation to stiffen the inner portion of the disc may be made prior to heat treatment. If a groove for a tire was made, the tire can pressed in position by springing the projecting members.

Fig. 1 is a plan view of a sheet metal blank where 1 is the
30 extended member of a disc with edge 2, 3 is a hole located for the drive pin 11 and 4 is a hole located for the pilot 12.

Fig. 2 is a cross-sectional drawing of a sheet metal wheel blank pre-bent for final forming where extended members 1 are bent up to an acute angle 5 that is 3° to 5° larger than angle 6 between punch 8
35 and die 19.

Fig. 3 is a partial cross-sectional drawing of a press, punch and die combination where holder 7 contains round guide bushing 9 and parallel guide bushing 10 wherein punch 8 may slide up and down with no rotation into pocket in die 19 with die 19 held in place by bolt 18.

- 5 The axis of punch 8 forms an acute angle 6 with face of die 19. The indexing components in die 19 are drive shaft 17 located with thrust 13. needle bearings 14 and 15 with upper end pilot 12 and drive pin 11 and with indexing ratchet gear 16 on lower end. Wheel shape 20 is curved and has a groove for a tire.